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PLANT INDUSTRY

PLANT IMMIGRANTS.

No. 172 AUGUST, 1920.

GENERA REPRESENTED IN THIS NUMBER.

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Foreign Seed and Plant Introduction.

EXPLANATORY NOTE.

This multigraphed circular is largely made up from notes received from agricultural explorers, foreign correspondents, cooperators, and others, relative to the more important plants which have recently been received by the Office of Foreign Seed and Plant Introduction of the Department of Agriculture; in it are also contained accounts of the behavior in America of plants previously introduced. Descriptions appearing here are revised and published later in the Inventory of Seeds and Plants Imported.

Applications from experimenters for plants or seeds described in these pages may be made to this Office at any time. As they are received the requests are placed on file and when the material is ready for the use of experimenters it is sent to those who seem best situated and best prepared to care for it. The plants or seeds here described (except such as are distributed direct or are turned over to specialists in the Department who are working on investigational problems) are propagated at our Plant Introduction Field Stations, and when ready to be distributed are listed in our annual check lists, copies of which are sent to experimenters in the late fall. It is not necessary, however, to await the receipt of these lists should one desire to apply for plants which are described herein.

One of the main objects of the Office of Foreign Seed and Plant Introduction is to secure material for plant breeders and experimenters. Every effort will be made to fill specific requests for experimental quantities of new or rare foreign seeds or plants.

David Fairchild,
Agricultural Explorer in Charge.

Office of Foreign Seed and Plant Introduction,
Bureau of Plant Industry,
U. S. Department of Agriculture.

Issued August 23, 1920. Washington, D.C.

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Attalea cohune (Phoenicaceae), 50527. **Cohune.** From Ceiba, Honduras. Seed presented by Mr. Charles N. Willard, American consul. "With the demand for combating the use of poison gas in the war, it was found that the shell of the cohune nut when carbonized, acted as a preventive against the injurious effects of the gas. It therefore became the principal element used in the manufacture of the gas mask. The utilization of the cohune nut for war purposes served to bring to light an industry which may be permanent, namely, the extraction of oil from the kernel of the nut. The cohune (or corozo) nut is a product of the manaca palm, is indigenous to tropical countries, and is found mostly on low, damp lands, along creeks and rivers. It thrives best in the deep forests, and the greatest supply is found in virgin forest lands, of which there are extensive areas in Honduras.

"The nuts grow in large oblong clusters weighing probably 75 pounds each. A single tree will have from 1 to 4 clusters on it at a time with an average production of 4 clusters a year to the tree. The nut varies in size from 1½ to 3 inches in length and from 1 to 2 inches in diameter. The shell is hard and dense, with an average thickness of ¼ to ½ inch. For cracking the nuts, preparatory to extracting the oil, two varieties of machines are used. One is designated a 'knuckle' machine, in which the nuts drop from a hopper between heavy knuckles thus cracking the shell. The other is called an 'impact' machine. It operates by a centrifugal motion which propels the nut against the side of a large metal bowl with sufficient force to break the shell. The oil can then be extracted from this copra or crushed product.

"The oil is high grade, and is said to be superior to coconut oil; it finds a ready sale for cooking purposes, the preparation of foods, or any use to which a good cooking oil may be put. The Aguan River valley contains a single field of these nut-bearing trees extending 60 to 70 miles up the river from its mouth and with an average width of 10 to 12 miles." (Willard.)

Cedrus atlantica (Pinaceae), 50313. From Tangier, Morocco. Seed presented by Mr. Jules Goffart, Societe d'Horticulture. This vigorous tree is one of the finest of evergreens. It is pyramidal in form and has dense, light, silvery foliage. In its native territory, the Atlas Mountains of Algeria, it reaches a height of 120 feet. It thrives splendidly on the Pacific coast of the United States and can be grown in a sheltered position on the Atlantic coast as far north as New York.

(Adapted from Florists' Review, vol. 34, p. 78.)

Citrus sp. (Rutaceae), 50967. From Swatow, Kwangtung, China. Seeds presented by Mr. A. H. Page. "A fruit we call the Chinese lime. The nearly ripe one weighs now about 4½ ounces, the green one 2 ounces. Either would make a fairly good 'lemon' pie, the riper one having the better flavor. The tree is very hardy and bears immense crops. I picked nearly 600 last fall from a tree about 9 feet high and of moderate spread. I certainly believe it is worth a trial for lime juice and citric acid." (Page.)

Coffea excelsa (Rubiaceae), 50632. Coffee. From Cape Town, Cape Colony. Seeds presented by Mr. J. Burtt-Davy, through Mr. George H. Murphy, American consul general. A large-leaved tree of vigorous growth, closely allied to *Coffea liberica*, but a stronger grower, and apparently a better producer; the seeds are, however, smaller than those of the true Liberian coffee. It is apparently a plant which has considerable powers of thriving under very adverse conditions. Nearly 9 pounds of berries to a tree have been gathered from this variety. It prefers low situations but may be planted up to 2,000 feet above sea level.

Below is a table showing the weight of berries of various coffees required to give one kilogram of marketable coffee:

Coffea canephora var. *kanuruensis*	4.7 kg.
canephora	3.8 kg.
robusta (Java)	3.8 kg.
excelsa	5.5 kg.
liberica	12.0 kg.
dewevrei	8.3 kg.
aruwimiensis	6.7 kg.

C. excelsa is found in the wild state in central Africa at altitudes of 2,200 feet in a climate which is dry for six months of the year and has a rainfall of at least 40 inches during the remaining six months. The temperature in summer is tropical, while in December and January it falls below 10° C. (50° F.) at night. This type does well in equatorial regions, has a satisfactory strength in caffein, and, though somewhat bitter, it has an excellent flavor. In Tonking its growth has been remarkable and entirely free from insect and fungous pests. The bean is small and uniform in size and it is hoped that it may sell in competition with Arabian coffee blended with Mocha. In appearance

it is less luxuriant than *C. liberica* though it is hardier and earlier. This species is particularly robust in Java. It commences to flower in the second year and yields a crop of berries in the third year.

The value of the coffee approaches that of the Liberian coffee and amounts to about 20 pounds per acre. The beans require particular care since they are inclosed within a skin which must be completely removed before the highest prices can be obtained. (Adapted from Bulletin of the Department of Agriculture, Trinidad and Tobago, vol. 17, p. 62.)

Cyclamen rohlfsianum (Primulaceae), 50529. **Cyclamen.** From Tripoli, Libia. Tubers presented by Dr. O. Fenzi. "I hope that some of your Cyclamen specialists may succeed in evolving a new type combining the characters of Cyclamen and of Dodecatheon." (Fenzi.)

A plant native to the grottoes of Gureina, Libia, where the yellow ellipsoid tubers grow in the fissures. The stem, 5 cm. long, bears circular leaves, variegated with silvery splotches and variously incised, on petioles 3 to 18 cm. long. The fragrant pale-purple flowers appear in autumn; the exserted anthers bring it near the neighboring genus, Dodecatheon. (Adapted from Boissier, Bulletin de L'Herbier, vol. 5, p. 528.)

Erythrina sp. (Fabaceae), 49759. From Guatemala, Guatemala. Seeds collected by Mr. Wilson Popenoe, agricultural explorer. "(No. 338a. El Barranquillo.) 'Pito.' One of the native Erythrinas. While not so valuable perhaps as a flowering plant as some of its congeners, it has the interesting feature of edible flower buds, and it is a vegetable of some importance among the Guatemalans. The buds are boiled with meat." (Popenoe.)

Guilielma utilis (Phoenicaceae), 50679. **Palm.** From San Jose, Costa Rica. Seeds collected by Mr. Wilson Popenoe, agricultural explorer. "(No. 391a) 'Pejibaye Palm'. A remarkable food plant, of ancient cultivation in Costa Rica, and certainly deserving of wide dissemination in the Tropics. Pittier says: 'The Indians (of Costa Rica) have cultivated it since a remote period, and it is not now known in the wild state.' Gagini quotes Alcedo to the effect that the fruit is almost the only food of the Guaimies and the Indians of southern Talamanca, in this country. It is today grown commercially in the vicinity of Tucurrique, on

the Altantic side, and is also known on the Pacific side, though not so abundant there. In the markets of San Jose the fruit is always in great demand and brings a high price.

"The palm is a beautiful pinnate-leaved species, with a slender trunk reaching to 50 feet, though commonly not more than 35 feet. The leaves resemble those of *Cocos plumosa* and other palms of that type, while the trunk is armed from top to bottom with thin, sharp spines about 2 inches long. Flowers are produced in the spring, from March to June (occasionally at other times of the year), and are followed by stout racemes of fruit which matures principally in the autumn. The racemes sometimes weigh 25 pounds, and as many as 5 or 6 are produced by the palm in a single crop. The individual fruits are top shaped, up to 2 inches long, yellow to deep orange, with a thin skin, and a hard seed in the center surrounded by abundant flesh of orange or yellow color, firm texture, and dry, farinaceous character. Seedless varieties are known, and since these can be propagated, like date palms, by means of offshoots, of which the plant produces several in the course of its life, the establishment of superior forms should be simple.

"The 'pejibaye,' which is one of the most popular of all Costa Rican fruits (though it should not, perhaps, be called a fruit, except in a botanical sense) is prepared for eating by boiling for three hours in salted water, after which it is pared and the flesh, which strikingly resembles boiled chestnuts in appearance and flavor, is eaten without seasoning of any sort. Doubtless the fruit would lend itself to many uses, such as stuffing for fowl, but it is so good in its simple form that Costa Ricans have not sought to improve it by bringing it under the influence of culinary art.

"The palm is said to come into bearing at 6 to 8 years from seed, and to live at least 50 years. It is found in Costa Rica from sea level up to 5,000 feet elevation, but in extremely wet regions above 4,000 feet some of the palms do not bear. The ideal region for it seems to be, in this country, between 2,000 and 3,500 feet, and where the rainfall is not great. It does not appear to be particular as regards soil.

"The fruit contains about 40 per cent of carbohydrates, and according to an analysis made in San Jose, one pound of the flesh represents 1,096 calories of energy, which entitles the 'pejibaye' to serious consideration as a food plant. It seems to me that it

PEELING THE MANILA OR PHILIPPINE MANGO.

(*Mangifera indica* L. See S. P. I. No. 46238.)

This valuable seedling race was brought to Mexico from the Philippines and is now grown in several parts of that Republic, as well as in Cuba and southern Florida. It comes true from seed, and the fruit is nearly free from fiber and of excellent quality. In regions where budded or grafted plants of the best Indian mangos are not obtainable seedlings of the Manila race should be planted extensively. Their fruits are nearly as good as those of the best Indian varieties. (Photographed by Wilson Popenoe, Tehuantepec, State of Oaxaca, Mexico, June 24, 1918; P17506FS.)

CHINESE EDIBLE-FRUITED OAK.

(*Lithocarpus cornea* (Lour.) Rehder. See S. P. I. No. 47365.)

This Chinese edible-fruited oak, the first of its kind to grow on this side of the Pacific, has formed acorns in Mississippi. The flowers appear in the fall and the fruit ripens the second year. The foliage is very handsome, and the acorns are as hard shelled as hickory nuts and have kernels as sweet as those of the filbert. The spade by the tree is 5 feet 2 inches above ground. (Photographed on J. P. Wilson's Farm, Landon, Miss., July 9, 1918; P24315FS.)

should be widely planted in tropical regions. In the United States, it may perhaps succeed in southern Florida, but the climate of California is probably too cool for it." (Popenoe.)

Ixophorus unisetus (Poaceae), 50650. **Grass**. From Guatemala, Guatemala. Seeds collected by Mr. Wilson Popenoe, agricultural explorer. "(No. 372a.) 'Zacate blanco.' A native grass from Quirigua in the lower Motagua Valley, altitude 250 feet. This is considered one of the best native forage grasses of its region. Its leaves which are succulent and about half an inch wide, reach the height of about 2 feet. The palm seems to thrive in moist places." (Popenoe.)

Manihot esculenta (Euphorbiaceae), 50837. **Cassava**. From Zanzibar, Zanzibar Island. Seeds collected by Dr. H. L. Shantz, agricultural explorer. "(No. 677. Nyanza, Urundi.) The sweet cassava; seeds are quite abundant and the roots are sweet; they were eaten fresh and are very good. Seeds are not usually produced but are quite abundant here. This is by far the most important crop plant of this section. Corn is abundantly grown but is not as universal as Manihot. Drought may harm the corn crop, but even in severe drought a Manihot plantation can be dug up and the roots eaten. It is cultivated on elevated beds or ridges and allowed to remain for about 4 years when the roots are dug. Meanwhile the leaves have been eaten. This, on the lowlands and about Nyanza and Kigoma, is the chief money crop as well as the staple food. The roots are sold either fresh, or peeled, fermented, and dried, as flour, and as a cake,- the result of cooking the flour in water to form a thick starchy mass. This has no flavor except that derived from wood smoke. The cake is also made by boiling fresh roots and pounding them to paste in a mortar. The old stems are broken up and placed in the ground at the top of broad ridges 3 feet across and 1 to 2 feet high. Growth is rapid and the weeds and grasses are kept out by occasional hoeing. When about 4 years old the plants are dug and a new crop started. The leaves are eaten as a green vegetable, and the roots eaten (1) fresh, merely peeled and eaten (2) baked or boiled (3) baked or boiled and pounded to a paste (4) peeled, placed in earthen vessels with water and allowed to ferment 3 days and then sun dried. (They are often perfectly white but at times covered with a black or blue mold.) These dried roots are boiled in fat, and

eaten. (5) The dried fermented roots are pounded in a mortar and sifted to a white flour which is boiled to form a starchy paste. This doughy mass, wrapped in banana leaf, constitutes one of the principal foods of the natives. The flour is wrapped in banana-leaf containers weighing from 15 to 25 kilograms each. I have not found any of the bitter cassava; all plants which I have tasted are sweet. The fully matured crop forms an open thicket 6 to 10 feet high. At Nyanza, a leaf spot seemed to be the only disease, and this, although abundant, caused very little damage." (Shantz.)

Persea americana (Lauraceae), 50680. **Avocado**. From San Jose, Costa Rica. Cuttings collected by Mr. Wilson Popenoe, agricultural explorer. "(No.395.) Avocado No. 42, from the residence of Margarita Munoz. This avocado was called to my attention by Don Anastasia Alfaro, director of the National Museum. He recommends it as one of the finest known to him. and a variety of unusually late ripening season. The parent tree, which stands in a small back yard, about 10 feet from a house, is 30 feet high, slender in form, with a straight trunk 15 inches thick at the base, branched 8 feet above the ground. At this time (June, 1920) the fruits are not half grown, but judging by their present appearance and a plaster of Paris model made last year by Sr. Alfaro, it is possible to say that the form is oval to broad pyriform, and the size up to 1 pound in weight. The color is said to be green, the seed not unreasonably large, and the flesh of excellent quality. The season of ripening is September to November, sometimes to December. Most of the avocados in this region ripen in August and September. The tree is a heavy bearer, the fruits sometimes being produced in clusters of two or three." (Popenoe.)

Schizostachyum sp. (Poaceae), 50648. **Bamboo**. From Buitenzorg, Java. Plants presented by Dr. J. C. Koningsberger, director, Java Botanic Garden, through Mr. K. Heyne, Department of Agriculture. Late in 1915, Mr. L. C. Westenenk, a resident of Benkulen, Sumatra, while on a trip through the highlands of Kroe, found this solid-stemmed bamboo. Material was sent to the garden of the Museum of Economic Botany, Buitenzorg, where it grew abundantly, flowered, and fruited. This bamboo forms a thick stand about 7 m. (24 ft.) high; the green stems are 3 cm. (more than an inch) thick, with joints about 25 cm. (10 inches long). (Adapted from Teysmannia, vol. 30, p. 346.)

IS THE MANGO GOOD TO EAT ?
(Mangifera indica)

It will seem strange enough to any one who has learned to love the flavor of one of the most remarkable fruits in the world that such a question could be appropriate, but, to those of us who have had the chilling experience of offering mangos to people of the most refined tastes and getting unfavorable opinions in return, the question, "Is the mango good to eat?" is not so entirely out of place. Of course, it must be answered in the affirmative, but the answer must be accompanied by the statement that not even the most delicious peach in existence can compare in richness and wealth of flavor with a good mango. In our opinion, anyone who declares he can not abide mangos, either has never tasted a good one or, for some reason, has been unwilling to learn to like them.

In the summer of 1918 an unusually fine lot of mangos (the Totofari, the White Alphonse, and the Kala Alphonse) was sent up from the Miami Plant Introduction Field Station and when in prime condition these were served to the members of the Cosmos Club of Washington. Brief printed descriptions of the mangos, with space for the voluntary comments of those who tasted the fruits, were also distributed. The influencing of opinion was avoided as far as possible.

The following comments show how opinion differed with regard to these mangos and how often those who had eaten the mango in their travels were delighted to taste it again:

> Very pleasant flavor and excellent substance. Would prefer it to a good peach. (Earl B. Phelps.)

> I acquired the taste for mangos in Panama in 1909-11. The one I have just sampled was better than any I had on the Isthmus. (E.C. Sherman.)

> Think the fruit is very good on first trial. (F. Walker.)

> A most welcome addition to Cosmos Club menu. A delicious, juicy, and appetizing fruit, with a distinctive flavor that is most agreeable and refreshing. (Gilbert Grosvenor.)

> Very sorry but we did not like the mangos. (E. M. Redfield, wife of Secretary of Commerce.)

I like the fruit, like the queer acid of it,- but found it physically hard to eat: it wouldn't loosen from the stone by spoon action. (Hugh S. Bird.)

While it does not appeal to me, I imagine it will be appreciated by many who care for sweet fruit. (J. C. Heald.)

The most delicious fruit of the tropics. Can't get too many in the northern markets. (C. L. Marlatt.)

Delicious! I have traveled through the tropics and eaten many mangos, but none so delicate or readily edible as these. (Robert Anderson.)

The mango is an excellent fruit, and the mango habit is soon acquired by the initiated. The sample tried by me is very good indeed. I never ate a better one in Hawaii. (Henry W. Henshaw.)

The large size of the fruit, the large proportion of edible pulp, the fine flavor in which the "turpentine" quality is low, the almost entire absence of stringiness make this variety very attractive. (Albert Mann.)

At the same time that the mangos were sent to the Cosmos Club, some of the best of them (the Ameeri, Davy's Favorite, and the Kala Alphonse) were selected and sent by special arrangement to the wives of certain Cabinet officers, with whom I was personally acquainted and who were interested in plants. The variation in their replies is so typical that I have taken the liberty in quoting them. The enthusiasm of those who have been in mango-growing countries makes the comparison somewhat less sharp than it otherwise might have been as between those who did and those who did not like the flavor of the mango.

I am deeply appreciative of your remembering us, and I was tremendously interested in the mangos, but I am constrained to be perfectly frank and tell you that we did not care for them. It is just possible that they are one of the foods for which one could cultivate a taste, but it apparently is not a natural one with any member of my family. (Mrs. Newton D. Baker, wife of Secretary of War.)

The mangos were perfectly delicious. Never in Mexico did I ever taste better, and I am delighted to know they are being grown in this country, for now they will be in the market here. (Eleanor Lansing, wife of Secretary of State.)

Of course, we found Davy's Favorite the best of the varieties! But really I never ate such fine mangos either in Mexico or the West Indies. The flavor seems equally as good and the pulp thicker and less stringy. Mr. Burleson joins me in appreciation. (Adele S. Burleson, wife of Postmaster General.)

We found the mangos which you so kindly sent most delicious. This fruit would add exceedingly to our list of edible fruits. (Mrs. Josephus Daniels, wife of Secretary of the Navy.)

This summer (1920), a mango water ice* was served at the Cosmos Club and the comments of the guests secured in a similar way to that followed in the mango fruit test, and although the recipe used contained in it a considerable proportion of lemon juice the flavor was sufficiently mango in character to make it an interesting test.

The comment on this ice was somewhat less favorable as a whole than the comment on the fruit itself.

Perhaps my opinion may be accepted as even more valuable, if I say that I liked the mango ice so much that I duplicated the order. (John Bassett Moore, former councilor of State Department.)

Delicious. (Edwin Wendt.)

In spite of a faint turpentine taste, the mango ice was not bad. I think I should be able to pass a better judgment had I eaten of the fruit itself. (Wm. Drinnium.)

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* **Recipe**: 1 gal. mango juice, $2\frac{3}{4}$ lb. sugar, $1\frac{1}{2}$ pt. lemon juice, 1 gal. water.

Since this variety is 'cling' 50 mangos were cut in half and the juice extracted by pressing the seeds in a ricer. The other ingredients were added to the gallon of mango juice, and the mixture frozen as any water ice.

Fine. (No signature.)

I liked the mango ice very much on account of the delicacy of the flavor. (No signature.)

I like the taste of the mango eaten alone, but it does not seem well suited to preparation in the form of an ice. Perhaps the flavor is not strong enough to permit the dilution. (Herbert C. Marshall.)

The taste of the mango ice is excellent. (John W. Davis.)

Good. (Frank Sutton.)

Sweetly insipid or insipidly sweet. (J.H. Ralston.)

Very good. Real mango flavor. (Fred E. Weston.)

Suggests a little turpentine in an orange sherbet,- not bad at that. (No signature.)

Excellent. (H. O. Wood.)

Very fond of it as a fruit, but do not like it so well as a flavoring. The flavor is a little too strong. Try it weaker the next time, a mere suggestion of mango flavor. That is the way it is prepared in the Tropics, and it is more delicious. (Cyrus F. Wicker, former Secretary of Legation, Panama.)

I am convinced that this experiment, with what those of us who like it declare is a perfectly delicious fruit, is a typical demonstration of the caprice of taste in general. I can not attach to the fancies of whole peoples, such as the Irish distaste for corn bread, or the French dislike for sweet potato, or the Belgian dislike for rice, any deeper significance than lies in the simple fact that these peoples have not yet learned to like these delicate and wholesome foods. One of the secondary missions of this work of plant introduction is to break down the superstitions regarding plant foods and point out the unwisdom, if not the actual danger, of ridiculing foods which we have not tried to like or have not learned to care for. Food ridicule is tied up with ignorance and is a handicap in the struggle for existence of a race.

David Fairchild.

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BUREAU OF PLANT INDUSTRY
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WASHINGTON, D. C.

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